Stellar Emission Inhibiting the Study of “Exo-Chondrules” in Circumstellar Debris

Circumstellar discs provide insight into the formation of our own Solar System through studying the amount and distribution of debris. Remnants of the planet formation process, such as comets and asteroids, can act as a replenishing source of new debris that would otherwise be cleared on short timescales. The collisional evolution of these remnants will provide micrometre to centimetre sized grains, or “exo-chondrules”, that can be detected through heating from the host star.

One confounding parameter in studying these grains around stars, is the stars themselves. The emission from stars in the mm/cm is nontrivial and generally not well-constrained. I'll provide several examples of commonly studied debris discs around A stars where unconstrained stellar emission is biasing the flux recovered from the disc and thus inhibiting an accurate characterization of the debris system.

When comparing the stellar behavior to the most thoroughly studied star in the universe, the Sun, it appears as though these more massive stars may exhibit similar atmospheric processes, which are commonly assumed to not occur in A stars. Sirius A is a bright, nearby star with no known debris. Radio observations of Sirius A are being used to set an observationally determined standard for stellar atmosphere modeling and debris disc studies, as well as to take the first step toward characterizing potential intrinsic uncertainty in stellar emission at these wavelengths. This talk will highlight the ongoing effort to characterize stellar atmospheres through a project known as MESAS (Measuring the Emission of Stellar Atmospheres at Submillimeter/millimeter wavelengths).